Collecting moths by a mercury vapour lamp in the Surat Dangs, Gujarat State

BY

E. M. SHULL Dangs Rural Boarding School, Ahwa, Surat Dangs¹

AND

N. T. NADKERNY Bombay Natural History Society

(With a plate)

During the SW. monsoon, June-October 1961, hundreds of moths (Heterocera) were collected by one of us (EMS) by the light of a 400 watt mercury vapour lamp in the bus depot compound at Ahwa, headquarters of the Dangs District.

The town Ahwa is located in a plateau (alt. 1700 ft.) and is surrounded, at varying distances, mainly by teak trees and bamboo clumps. On dark nights the streets are lit by kerosene lamps which attract a few moths, whereas the powerful mercury vapour lamp located in the State Transport Depot compound attracts many moths and other insects.

The eastern boundary of the bus depot compound consists of a thick stone wall four and a half feet high. Broken glass embedded in concrete on the top of the wall provides numerous hiding places for moths. Near by, four feet from the wall and inside the compound, stands the 25 foot lamp post. The mercury vapour lamp hangs from an angle rod at the top of this post (Plate).

The monsoon season is the best time to collect moths. When the rainfall is heavy at night, the moths shelter on the near-by plants. When the rainfall is light or there is a period between showers, hundreds and even thousands of moths fly around the light. Even when the rainfall is heavy during the day and followed by no rain or by light showers at night, collecting is usually very good. Dry spells invariably meant a reduction in the number of moths appearing at the light. Most

¹ Present address : 402 Wayne Street, North Manchester, Indiana, U.S.A.

of the collecting was done from 8-00 p.m. to 10-30 p.m., after which time the light was usually turned off.

The length of vision of the insects is yet an unknown factor and, therefore, it is not possible to say from what maximum distances the moths were attracted to the light. The number of insects collected each night, hundreds at times, indicated that they were coming from very long distances. The number collected, more than a thousand during the season, represented only a fraction of the mass assembled at the light.

Previously S. Usman (10, 11, 12) had reported from Bangalore some insect attracted to light. 84 species of moths were included in his list. Very few of those listed by him appear in the present report. Sevasto-pulo (6, 7, 8, 9) reported about 444 species of moths collected in Calcutta over a period of nearly 17 years in 1930-46. His collection, however, included not only specimens collected at light but also those bred by him in the laboratory, collected from shrubs and trees etc. He was of the opinion that if the mercury light was available in India in those days a very much greater number of moths would have been recorded. Our collection was limited to a four month period, from the middle of June to the middle of October 1961.

The total number of species of moths collected was 180. A few of these which we could not identify were identified for us by the Forest Research Institute, Dehra Dun, to whom we are grateful. A few more were destroyed inadvertently.

Insects belonging to other Orders including some butterflies were attracted to the light and were collected but they are too numerous to be included in this paper. Collection was made with dacron nets and wide-mouthed glass jars. Moths at rest on the perpendicular wall and on low plants were easier to catch with jars. Cotton wool soaked with ether was used as our killing agent.

Collecting at night is sometimes made unpleasant by mosquitoes, blister beetles, and other insects. Also predatory geckos and bats competed for the moths and other insects.

WEATHER

Weather conditions during the period of collection will be of interest. In the following table the weekly rainfall and the average maximum and minimum temperatures recorded at Ahwa by the District Collector's office are shown. That year's rainfall (total 1554 mm.) was much below the average for the place, which averages to 2032 mm. There were very few cloud bursts. This may be one of the causes of such a heavy catch, as heavy downpours cause considerable damage to the exposed larvae and pupae in the soil.

		Total rainfall	Average daily	temperature
	Weeks*	in mm,	max. °C.	min. °C.
	1st	4.0	31.6	25.8
June	2nd	27.2	28.3	24.3
June	3rd	65.7	29.3	25.2
	4th	126.2	26.5	23.0
	1st	85.4	25.2	22.9
T. I.	2nd	203.2	23.3	21.2
July	3rd	168.6	23.3	20.7
	4th	88.4	24.8	20.9
	1st	107.0	22.4	20.0
	2nd	42.0	23.1	20.6
August	3rd	86.0	24.3	21.2
	4th	64.0	24.5	21.1
	1st	120.4	23.0	20.4
Ser. 1	2nd	120.0	23.6	20.9
September	3rd	58.0	23.5	20.7
	4th	21.0	23.8	21.3
	1st	8.0	26.3	21.4
0.11	2nd	153.0	25.3	21.4
October	3rd		27.2	21.9
	4th		27.8	22.1

RAINFALL AND TEMPERATURE AT AHWA IN 1961

*1st week: 1-7; 2nd week: 8-15; 3rd week: 16-22; 4th week: 23-end.

SPECIES COLLECTED

In listing the families we have followed the FAUNA OF BRITISH INDIA by Hampson, but within the families the arrangement is alphabetical for convenience of reference. The number of moths collected and the month in which they were caught are also shown in each case. The biggest collection was made in the first half of August and first half of September. Of the total number 40% were Noctuid moths and about 13% belonged

to the family Sphingidae. Notodontidae, Arctiidae, Geometridae, and Pyralidae contributed a fairly large number each to the collection, but the remaining families were represented by very small numbers. However, the number of specimens collected of any species does not give a correct idea of the number attracted to light as the size of the moths affected the size of the catch. Some of the Pyralids, e.g. *Schoenobius* spp., came in very large numbers but only a very few of them were collected whereas proportionately a very large number of Sphingids were easily collected because of their big size.

It is interesting to note that a very large number of species show an extension in the range of their geographical distribution as compared with the FAUNA OF BRITISH INDIA by Hampson (5) - Bell & Scott in the case of Sphingidae (3). Evidently, when these eminent authors wrote their publications the whole of India was not surveyed for insect life. Most of their species, therefore, were noted from the more frequented forest areas, such as south India, Kanara, the Himalayas, Sikkim, Assam, Burma, Ceylon, etc. The rest of India remained practically unexplored except for places like Bombay and surrounding areas where stray cases were noted. More than 40% of the species of the present catch, therefore, can be considered newly recorded in this area, even taking into consideration those species mentioned as occurring in this tract in some agricultural and forestry publications, such as Reports of the Entomological Meetings at Pusa, ECOLOGY AND CONTROL OF THE FOREST INSECTS, etc. From this point of view also the present list will prove important. To make clear the present extension, habitats previously noted by other authors are shown against each species.

Lastly, we have to acknowledge with thanks the co-operation extended to us by the Collector of the Dangs in supplying the meteorological data and to Shri S. D. Kale, teacher of the Ahwa School, in collecting the specimens.

Serial No.	Family and Species	No. collected	Month of collection	Distribution previously recorded
1 2	Fam. Saturnidae Actias selene Hubn. ¹ Antheraea paphia Linn.	 9	August do.	All over India do.

MOTHS COLLECTED AT AHWA IN THE DANGS DISTRICT

¹ The tails of the beautiful Moon or Fairy Moth (*Actias selene* Hubn.) provide an effective means of defence against insectivorous bats in addition to its speed and dodging ability, and we frequently saw the moth escape to safety while the bat carried away a portion of the tails.

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Serial No.	Family and Species		No. collected	Month of collection	Distribution previously recorded
	Fam. Eupterotidae				
3	Eupterote lineosa Wlk.		1	September	Nepal, Sikkim, Nilgiris, Ceylon
4	Eupterote minor Moore		1	do.	Does not seem to have been recorded in India
5	Eupterote mollifera Wlk. (= pulchra Swinh.)		1	August	All over India
6	Eupterote primularis Moore		1	do.	Nilgiris, (southern slopes)
7	Eupterote undata Blanch	•••	1	do.	Throughout India as far as the Nilgiris
8	Eupterote sp.	••	1	do.	
	Fam. Sphingidae				
9	Acherontia lachesis Fabr.		3	do.	All over India
10	Acherontia styx Westw.		1	do.	do.
11	Ambulyx deucalion Wlk.		1	July	E. and W. Hima- layas
12	Cephonodes hylas Linn.		1	do.	All over India
13	Deilephila nerii Linn.		1	do.	do.
14	Herse convolvuli Linn.		3	August	do.
15	Hippotion boerhaviae Fabr.		9	do.	E. and W.Himalayas
16	Hippotion celerio Linn.		1	do.	Most parts of India
17	Hippotion rafflesi But.		8 11	do. September	East Himalayas and South India
18	Macroglossum belis Linn.		1	July	West Himalayas, South India
19	Marnmba dyras Wik.		37 1	August September	NE. Himalayas, South India, Anda- mans
20	Meganoton nyctiphanes Fabr.		1	August	East Himalayas, and South India
21	Nephele didyma Fabr.	•••	14 7	do. September	All over India
22	Nephele didyma f. hespera Fabr.		23 4	August September	do.
23	Psilogramma menephron Cr.	•••	10	August	do.

Serial No.	Family and Species	No. collected	Month of collection	Distribution previously recorded
24	Theretra alecto alecto Linn	12 32	August September	W. and E. Hima- layas, South India, U.P.
25	Theretra boisduvali Bugn	4	August	East Himalayas
26	Theretra castanea Moore	2	do.	South India
27	Theretra clotho clotho Drury	42 2	do. September	E. and W. Hima- layas, South India
28	Theretra gnoma Fabr	17	August	S. India, Poona, Pusa, Jeolicote
29 ′	Theretra lycetus Cr	56 8	do. September	E. and W. Hima- layas, South India
30	Theretra nessus Drury	20 4	August September	E. and W. Hima- layas, South India
31	Theretra oldenlandiae Fabr	5 4	August September	E. and W. Hima- layas, South India, Darjeeling, Pusa, and Abbotabad
	Fam. Notodontidae			
32	Antheua servula Drury	2	August	All over India
33	Anticyra combusta Wlk	1	July	NW. Himalayas, Karachi, Poona
34	Cerura liturata Wlk	2	August	Sikkim, Assam, Bombay, Madras
35	Dudusa nobilis Wlk. ¹	1	September	Khasis, Bombay, Western Ghats, N. Kanara
36	Phalera raya Moore	62 4	August September	Sikkim, Nagas, Calcutta, Simla, Bombay
37	Pheosia strigata Moore	1	June	NE. Bengal, Kan- ara
38	Pydna galbana Swinh	1	September	Sikkim
39	Pydna longivitta Wlk	1	June	Simla, Sikkim
40	Pygaera sp	1		Nagas
41	Ramesa tosta Wlk. ²	1	August	L L
42	Spatalia argentifera Wik	4	do.	Sikkim, Kanara, Bangalore
And and an other states		CONTRACTOR CONTRACTOR		

¹ Bell (1935, *J. Bombay nat. Hist. Soc.* **38**: 134) states that this species is rare and certainly not attracted to light. ² So far recorded from Burma and Ceylon only. However, B.N.H.S. Collection contains specimens from Savantwadi, West Coast.

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Serial No.	Family and Species		No. collected	Month of collection	Distribution previously recorded
43	Stauropus alternus Wik.		1	August	Sylhet, Bombay, Ganjam, Kanara
	Fam. Zygaenidae				
44	Phauda limbata Wllgrn. (=flammans Wlk.)	••	1	September	Simla, Sikkim
	Fam. Cossidae				
45	Duomitus leuconotus Wlk.	••	1	do.	Simla, Sikkim, Calcutta
	Fam. Thyrididae				
46	Rhodoneura hamifera Moore (=Pyralis acutalis Wlk.)		1	do.	Nilgiris
47	Striglina decussata Moore (= conjuncta Swinh.)	•••	1	do.	Sikkim, Assam, Nagas
	Fam. Limacodidae				
48					
40	Altha nivea Wik.	••	1	do.	Simla, Kulu, all over India
49	Miresa decedens Wlk.	••	1 1	August September	Assam, Nilgiris
50	Miresa nivaha Moore		1	August	Kanara
51	Parasa bicolor Wlk.		1	September	All over India
52	Parasa hilaris Westw.		1	do.	do.
53	Parasa retracta Wlk. ¹		1	July September	
	Fam. Lasiocampidae				
54	Metanastria aconyta Cr.		1	do.	Sikkim, Kanara
55	Odonestis laeta Wlk.		1	do.	NW. Himalayas, Sikkim, Sylhet
56	Taragama sp.	••	1	do.	
	Fam. Lymantriidae				
57	Euproctis bipunctapex Hamps		1		Kangra, Nagas, Nilgiris
58	Euproctis fraterna Moore	•••	1 2	August September	All over India
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¹ No record of the locality is available in published literature. B.N.H.S. Collection is from Bombay, Belgaum, Khandesh, and Kanara by R. D. Bell,

Serial No.	Family and Species		No. collected	Month of collection	Distribution previously recorded
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59	Euproctis sp.	• •	1	September	•••
60	Laelia sp.	• •	1	August	
61	Lymantria rosea Hamps		1 1 1	July August September	Marapharita nea Sadiya, Assam
62	Lymantria viola Swinh.		1	do.	Bombay
	Fam. Hypsidae				
63	Digama hearsayana Moore .	•	1	do.	All over India
	Fam. Arctiidae				6
64	Amsacta lineola Fabr (= Creatonotus emittens Wlk	.j	18 2	August September	NW. Himalayas Nepal, Manipur South India
65	Callimorpha sp.		2	August	
66	Creatonotus lactinea Cr (= Rhodogastrea frederici Kirby)		3	September	All over India
67	Cyana peregrina Wlk.		1	do.	do.
68	Diacrisia obliqua Wlk. (= Spilosoma todarum Moore)		2 1	August September	do.
69	Estigmene perrotteti Guen (= Alphaea biguttata Wlk.)		2 8 11	July August September	Sikkim, Paresh nath, Kanara, Nil giris (western slopes
70	Estigmene nigricans Moore . (= Alphaea nigricans Moore)	·	2 2 1	July August September	Deccan, Bombay Matheran
71	Macrobrochis gigas Wlk.		1	July	Sikkim, Bhutan Assam
72	Nepita conferta Wlk.		1	September	All over India
73	Nola major Hamps.		3	do.	Nilgiris (western slopes, 3000 ft.)
74	Pericallia (Arctia) ricini Fabr		1	August	All over India
75	Philagria entella Cr		4 3	do . September	South India
76	Spilosoma (Thyrgorina) eximea Swinh.	1	1 3	July September	Kanara

Serial No.	Family and Species.		No. collected	Month of collection	Distribution previously recorded
	Fam. Agaristidae				
77	Aegocera bimaculata Wlk.		1 2	June July	Plains of India, Sikkim
78	Aegocera tripartita Kirby ¹		1	June	
79 -	Aegocera venulia Cr.		1	August	Sub-Himalayan tracts of Kashmir and Sikkim, and plains of India
80	<i>Eusemia adulatrix</i> Koll.		1	September	All over India
	Fam. Noctuidae				
81	Acantholipes sp.		1	do.	
82	Acontia intersepta Guen.		1	do.	All over India
83	Acontia transversa Guen.		1	July	do.
84	<i>Agrotis flammatra</i> Fabr.		1 2	do. September	NW. Himalayas, Punjab, Sikkim, and vide Fletcher (4) Pusa in its south- ernmost limit
85	Anomis fulvida Guen.		1.	do.	All over India
86	Anomis mesogona Wlk.		1	do.	do.
87	Calesia dasyptera Koll.		1	do.	do.
88	Calesia phaeosoma Hamps.		1	do.	Nilgiris
89	Calesia satellitia Moore		3 5 1	July August September	W. and S. India
90	Calpe emarginata Fabr.		1	August	Ail over India
91	Calpe minuticornis Guen.		1	September	do.
92	Catephia lineola Guen.		1	August	do.
93	Cetola dentata Wlk.	••	1	October	Nepal, Mhow
94	Chrysopera combinans Wlk.		1	June	NW. Himalayas, and peninsular India
95	Churia arcuata Wlk. (= Churia iconica Wlk.)		12	September	Sikkim, Khasis, Khandesh, Nilgiris

¹ Not recorded in India so far. However, B. N. H. S. Collection contains specimens from Tanna (= Thana).

Serial	Family and Smarin	No.	Month of	Distribution
No.	Family and Species	collected		previously recorded
96	Cirphis sp. ¹	1	September	
97	Cirphis sp. ¹	1	do.	
98	Cosmophila erosa Hubn	1	do.	All over India
99	Egnasia accingalis Wlk	1	August	India
100	Episparis varialis W1k	1 3	July August	All over India
101	Erastroides curvifascia Hamps.	1	do.	Ganjam and Nilgiris
102	Ercheia cyllaria Cr	1	do.	All over India
103	Erygia apicalis Guen	1	September	do.
104	Eutelia nugatrix Guen	1	do.	do.
105	Fodina stola Guen	1	July	NW. Himalayas, Sikkim, Bhutan
106	Grammodes geometrica Fabr	4	September	All over India
107	Hamodes aurantiaca Guen	1	August	W. India, Sikkim, Assam, Andamans
108	Heliothis obsoleta Fabr	1 2	July September	All over India
109	Hyblaea puera Cram. ²	1	July	do.
110	Hylodes caranea Cram	1	September	do.
111	Hypocala biarcuata Wlk	1	August	Kanara, Tenas- serim
112	Hypocala rostrata Fabr	1	September	NW. Himalayas, Kanara, Nilgiris
113	Leucanea irregularis Wlk. ³	1	July	••
114	Leucanea sp	1	September	
115	Masalia (=Timora) terracotta Hamps. = Chariclea beatrix Moore)	6	do.	Baluchistan Mhow, NW. Hima- layas
116	Nyctipao hieroglyphica Drury	1	August	Kanara, Nilgiris, and all over India
117	Nyctipao macrops Linn	1	do.	All over India
118	Ophideris ancilla Cram	1	September	do.

¹ These two specimens belong to two different species of *Cirphis* but could not be specifically identified. ² Thousands resting on teak trees in July and August. ³ Not recorded in India so far. However, B.N.H.S. Collection contains specimens from Ceylon.

Serial No.	Family and Species		No. collected	Month of collection	Distribution previously recorded
119	Ophideris fullonica Linn.	• •	1	September	All over India
120	Ophideris materna Linn.	••	1	do.	do.
121	<i>Ophiusa algira</i> Linn.	·	1 6	July August	do.
122	Ophiusa coronata Fabr.	••	2	do.	do.
123	Ophiusa crameri Moore	••	3	do.	All over India
124	<i>Ophiusa dotata</i> Fabr.		1	do.	do.
125	Ophiusa joviana Cram.	• •	1	September	do.
126	Ophiusa melicerta Drury	••	5 1	Aug <mark>u</mark> st September	do.
127	Pandesma anysa Guen.	••	6 12	August September	do.
128	Pericyma umbrina Guen.		1	do.	India and Burma
129	Plecoptera reflexa Guen.		32	August September	All over India
130	<i>Plusia eriosoma</i> Doub.	• •	2 7	August September	do
131	Plusia jessica But.		1 5	August September	NW. Himalayas
132	<i>Plusio ni</i> Hubn.		4 1	August September	All over India
133	<i>Plusia signata</i> Fabr.		1	do.	Bihar, S. India
134	Polydesma inangulata Guen.		8	do.	All over India
135	Polytela gloriosa Fabr.		1	do.	do.
136	Prodenia litura Boisd.		3	August	do.
137	Pseudelydna rufoflava Wik.	• .	1	do. we	Almora
138	Psimada quadripennis Wlk.		1 1	do. September	Kanara, Anda- mans
139	Remigia archesia Cram.		1	do.	All over India
140	<i>Remigia frugalis</i> Fabr.		1	do.	do.
141	Rhesala imperata Wik.		1	August	Andamans
142	Sesamia inferens Wlk.		3	September	Sind, Bombay Mhow, Surat, Nav- sari
143	Spirama retorta Cram.		5 4	August September	All over India

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Serial No.	Family and Species	No. collected	Month of collection	Distribution previously recorded
144	Spirama unistrigata Guen	2	August	Sikkim, Assam
145	Spirama vespertilio Fabr	6 2	do. September	All over India
146	Spodoptera mauritia Boisd	1 2	August September	do.
147	Thermesia rubricans Boisd	2	do.	do.
148	Trigonodes hyppasia Cram	1	do.	do.
149	Westermannia superba Hubn	1 5	August September	W. and S. India
150	Zalissa transiens Wlk	1	do.	Sikkim, Khasis, Nagas
151	Zalissa venosa Moore	1 1	June August	Sikkim
	Fam. Uranidae			
152	Pseudomicronia coelata Moore	1	do.	Sikkim, Khasis, Nilgiris
	Fam. Epiplemidae			
153	Dirades theclata Guen	2	do.	All over India
154	Epiplema quadricaudata Wlk.	1	September	Assam, Kanara, Andamans
	Fam. Geometridae			
155	Aplochlora vivilaca Wlk	1	August	Sikkim, Bombay, Khandala
156	Biston raptaria Wlk	1	do. September	Nilgiris
157	Biston suppressivia Guen	9	August	Kangra, Sikkim, Assam, Calcutta, and South India
158	Biston varianaria Swinh.	34 13	do. Septemter	Mhow, Poona, N. Kanara
159	Ctenognophos sp	1	do.	
160	Hyposidra talaca Wik	4 3 1	July August September	All over India
161	Macaria fasciata Fabr	1	July	do.
162	Phibalapteryx hypospilata Guen.	1 3	August September	Khasis, Mahable- shwar, Nilgiris, Anamalais

Serial No.	Family and Species	No. collected	Month of collection	Distribution previously recorded
163	Platycerota punctilineata Hamps. ¹	1	August	
164	Semiothisa eleonora Cr	1 1	July October	All over India
165	Thalassodes quadraria Guen	1	September	do.
	Fam. Pyralidae			
166	Agathodes ostentalis Hubn	1 1	August September	do.
167	Botyodes asialis Guen	1	do.	do.
168	Charltona sp	1	August	
169	Glyphodes vertumnalis Guen	1 17	July August	All over India
170	Maruca amboinalis Feld	1	do.	Sikkim, Khasis, Nilgiris
171	Nymphula depunctalis Guen	1	do.	All over India
172	Pachyzancla phaeopteralisGuen.	1	September	do.
173	Pachyzancla sp	18 2	August September	
174	Pygospila tyres Cr	1 10 2	July August September	All over India
175	Schoenobius bipunctifer Wlk. ²	1	do.	do.
176	Schoenobius incertellus Wlk. ²	2	do.	Nagas, Calcutta, S. India
177	Sylepta adductalis Wlk	1	do.	Nilgiris
178	Sylepta aurantiacalis Fisch	1	do.	All over India
179	Sylepta concatenalis Wlk	1	do.	Sikkim
180	Sylepta derogata Fabr	1	do.	All over India

¹ Not recorded in India so far. However, B.N.H.S. Collection contains specimens from Karwar, N. Kanara. ² These moths were attracted to light in very large numbers, but only a few were

caught.

REFERENCES

1. BEESON, C.F.C. (1941) : Ecology and Control of the Forest Insects. The Vasant Press, Dehra Dun.

Vasant Press, Dehra Dun. 2. BELL, T.R. (1935) : A description of the Notodontid Moth, *Dudusa nobilis* Wlk. and its early stages. J. Bombay nat. Hist. Soc. 38: 134-136.

Wik and its early stages. J. Bombay nat. Hist. Soc. 38: 134-136. 3. _____, & Scorr, F.B. (1937). The Fauna of British India, Moths. 5. Taylor and Francis Ltd., London. J. F. (1910). Anno.

4. FLETCHER, T.B. (1919) : Annotated list of Indian crop-pests—Lepidoptera. Report of the Proc. III Ent. Meet, Pusa : 52-133.

5. HAMPSON, G.F. (1892-6) : The Fauna of British India, Moths. 1-4. Taylor and Francis Ltd., London. 6. SEVASTOPULO, D.G. (1956) : Notes on the Heterocera of Calcutta. Part I. J. Bombay nat. Hist. Soc. 53 : 415-422.

7. ____ (1956) : Part II. ibid. : 651-658.

8. _____ (1957) : Part III. ibid. 54 : 153-155.

9. _____ (1957) : Part IV. ibid. : 302-308.

951. 12. ——— (1956) : Part III. ibid.

12. ——— (1956) : Part III. ibid. 53 : 482-484.